Novel Microgreen Crop Testing for Space



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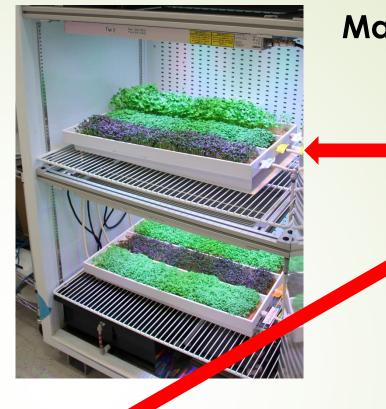
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Background

- Increase the number of crops that can be reliably grown in space under narrow band LEDs and elevated CO₂ (~3000 ppm)
- Select crops that address nutritional deficits and meet crew acceptability





Materials and Methods

- Microgreen cultivars selected
- Cultivated in NFT system
- \sim 3000 ppm CO₂, 50% Relative Humidity, 23°C, and PPF \sim 300 μ mol m⁻² s⁻¹
- Samples were harvested
- Nutritional analysis was conducted by outside lab
- Samples were washed, packaged and shipped to
 Johnson Space Center Food Laboratory for sensory analysis



Crop Type	Cultivar
Bean	Mung Beans
Beet	Detroit Mix
Beet	Bulls Blood
Brussels Sprouts	Long Island Im proved
Chia	Black OG
Collards	Vates
Cress	Cressida
Cress	Upland
Grain	quinoa
Grain	Buckwheat Groats
Kohlrabi	Early White Vienna
Kohlrabi	Purple Vienna
Lentils	Green
Melon	Cantaloupe
Mustard	Tatsoi
Nasturtium	Empress of India
Nasturtium	Alaska
Orach	Purple
Pea	Dun
Pea	Snow Pea, Dwarf Sugar Grey
Pea	Snow Pea, Mammoth Melting Sugar Pod
Pea	Dwarf Grey Sugar Pea
Pea	Mammoth Melting Sugar Pea
Root	Carrot
Shiso	(Perilla) Green
Sunflower	Black Oil
Swiss Chard	Yellow
Tree	Chinese Mahogany

Microgreen Cultivars



Sensory Results

	Average							
Sample	Overall	Appearance	Color	Aroma	Flavor	Texture		
Dun Pea	7.	1 8.0	8.1	6.3	7.1	7.7		
Sunflower	6.	7.9	8.0	6.5	6.5	7.4		
Buckwheat	6.	7.3	7.3	6.6	6.6	6.6		
Collards	6.	7 7.8	7.8	6.3	6.6	7.4		

	Average								
Sample	Tenderness	Bitterness	Crispness	Nuttiness	Sweetness	Aromatic			
Dun Pea	3.0	3.5	3.1	2.9	2.6	2.6			
Sunflower	3.0	3.7	2.8	2.7	2.7	2.6			
Buckwheat	3.3	3.3	2.7	2.7	2.6	2.9			
Collards	3.0	3.3	2.8	2.9	2.5	2.6			

Dun Pea

Pros

- Could definitely taste the raw peabean flavor.
- Crispy and extremely fresh
- Beautiful color

Cons

- Dislike too much stem
- Not much aroma
- Too bitter

Sunflower

Pros

- Good leaf to stem ratio
- Beautiful green color and nice and crispy
- Buttery mouth feel

Cons

- Too tender
- No aroma
- Too bitter

Buckwheat

Pros

- Tasted slightly 'grassy', brought back childhood memories of rolling around on the lawn!
- Fresh taste with very little bitterness

Cons

- Wilted
- No aroma
- Too much stem

Collards

Pros

- Enjoyed slight spicy and nutty flavor
- Crispy and fresh
- Liked them and would be a good thing to have in flight to add flavor

Cons

- Grassy
- Not much aroma

